

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A magnetic memory comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing and not when the at least one magnetic element is in a quiescent state.
2. (Currently Amended) ~~The~~ A magnetic memory ~~of claim 1~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing;
wherein the at least one stress induces at least one anisotropy on the at least one magnetic element during writing, the at least one anisotropy reducing a total anisotropy energy perpendicular to a stable state of the at least one magnetic element.
3. (Original) The magnetic memory of claim 1 wherein the magnetic element includes a plurality of layers and wherein the at least one stress is in a direction perpendicular to a plane of at least one of the plurality of layers.

4. (Original) The magnetic memory of claim 3 wherein at least one layer is a free layer.

5. (Original) The magnetic memory of claim 4 wherein the free layer includes a ferromagnetic layer and a capping layer, the free layer having a high positive magnetostriction.

6. (Original) The magnetic memory of claim 5 wherein the free layer has a surface anisotropy and a total anisotropy perpendicular to a stable state of the free layer, the capping layer configured to modify the surface anisotropy to reduce the total perpendicular anisotropy and capable of including Cu, Au, Pd or Pt.

7. (Original) The magnetic memory of claim 4 wherein the at least one magnetic element includes at least one spin tunneling junction.

8. (Currently Amended) ~~The A~~ magnetic memory of ~~claim 4~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing;
wherein at least one layer is a free layer; and
wherein the at least one magnetic element includes at least one spin valve.

9. (Currently Amended) ~~The~~ A magnetic memory of ~~claim 4~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing;
wherein at least one layer is a free layer; and
wherein the at least one magnetic element includes at least one spin valve
portion and at least one spin tunneling junction portion the at least one spin valve
portion and the at least one spin tunneling junction portion sharing the free layer.

10. (Original) The magnetic memory of claim 9 wherein the at least one spin
valve portion includes a first pinned layer having a first ferromagnetic layer closest to
the free layer and wherein the at least one spin tunneling junction portion includes a
second pinned layer having a second ferromagnetic layer closest to the pinned layer,
the first ferromagnetic layer being pinned in a first direction, and the second
ferromagnet layer being pinned in a second direction opposite to the first direction.

11. (Original) The magnetic memory of claim 1 wherein the at least one
magnetic element has a plurality of sides and wherein the at least one stress-assist
layer surrounds the plurality of sides of the at least one magnetic element.

12. (Original) The magnetic memory of claim 1 further comprising:
a plurality of word write lines; and

wherein the at least one stress-assist layer resides between the plurality of word lines and the at least one magnetic element.

13. (Currently Amended) ~~The A~~ magnetic memory ~~of claim 1~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing;

wherein the stress assist layer further includes bilayer of at least one of
IrO₂/PZT, MnO/PZT, TiO_y/PZT, Al₂O₃/PZT, Al₂O₃/PMN, Al₂O₃/SrBaTiO₃, SiO₂/PZT or
SiO₂/SrBaTiO₃, where PZT is PbZr_{1-x}Ti_xO₃, wherein PMN is PbMn_{1-x}Nb_xO₃ with PbTiO₃
and wherein x is an fraction less than 1.

14. (Currently Amended) A magnetic memory comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing and not when
the at least one magnetic element is in a quiescent state, the stress-assist layer
including at least one of a piezoelectric and an electrostrictive material.

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Currently Amended) ~~The A~~ magnetic memory ~~of claim 1~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing;
wherein each of the plurality of magnetic elements further includes a first lead
and a second lead for driving current through the magnetic element in a perpendicular-
to-a plane direction to allow the magnetic element to be written using spin transfer.

31. (Currently Amended) ~~The A~~ magnetic memory ~~of claim 1~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing;
wherein each of the plurality of magnetic elements includes a free layer having a
first ferromagnetic layer having a first magnetization, a second ferromagnetic layer
having a second magnetization, and a separation layer between the first ferromagnetic
layer and the second ferromagnetic layer, the separation layer configured to align the
first magnetization and the second magnetization antiparallel.

32. (Currently Amended) ~~The~~ A magnetic memory of ~~claim 14~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing, the stress-
assist layer including at least one of a piezoelectric and an electrostrictive material;
wherein each of the plurality of magnetic elements further includes a first lead
and a second lead for driving current through the magnetic element in a perpendicular-
to-a plane direction to allow the magnetic element to be written using spin transfer.

33. (Currently Amended) ~~The~~ A magnetic memory of ~~claim 14~~ comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;
at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing, the stress-
assist layer including at least one of a piezoelectric and an electrostrictive material;
wherein each of the plurality of magnetic elements includes a free layer having a
first ferromagnetic layer having a first magnetization, a second ferromagnetic layer
having a second magnetization, and a separation layer between the first ferromagnetic
layer and the second ferromagnetic layer, the separation layer configured to align the
first magnetization and the second magnetization antiparallel.

34. (Currently Amended) ~~The~~ A magnetic memory of ~~claim 14~~ comprising:

a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing;

wherein each of the plurality of magnetic elements has at least one layer and being configured to be written using spin transfer of charge carriers polarized by at least one layer having an in-plane magnetization.

35. (Currently Amended) ~~The~~ A magnetic memory ~~of claim 1~~ comprising:

a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing;

wherein each of the plurality of magnetic elements further includes a ferromagnetic free layer and a nonmagnetic capping layer on the ferromagnetic free layer, the nonmagnetic capping layer reducing the perpendicular anisotropy of the ferromagnetic free layer.

36. (Currently Amended) ~~The~~ A magnetic memory ~~of claim 1~~ comprising:

a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing;

wherein the at least one stress-assist layer being adjacent to a portion of each of the plurality of magnetic elements without residing above or below any of the plurality of magnetic elements.[[.]]

37. (Currently Amended) ~~The~~ A magnetic memory of claim 14 comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing;

wherein the plurality of magnetic elements includes at least one ferromagnetic layer, each of the at least one ferromagnetic layer having an in-plane magnetization.

38. (Currently Amended) ~~The~~ A magnetic memory of claim 14 comprising:
a plurality of magnetic elements, each of the plurality of magnetic elements being
configured to be written using spin transfer;

at least one stress-assist layer configured to exert at least one stress on at least
one magnetic element of the plurality of magnetic elements during writing, the stress-
assist layer including at least one of a piezoelectric and an electrostrictive material;

wherein each of the plurality of magnetic elements further includes a ferromagnetic free layer and a nonmagnetic capping layer on the ferromagnetic free layer, the nonmagnetic capping layer reducing the perpendicular anisotropy of the ferromagnetic free layer.

39. (Previously Presented) A magnetic memory comprising:

a plurality of magnetic elements, each of the plurality of magnetic elements being configured to be written using spin transfer, each of the plurality of magnetic elements including a ferromagnetic free layer having an perpendicular anisotropy and a nonmagnetic capping layer on the ferromagnetic free layer, the nonmagnetic capping layer reducing the perpendicular anisotropy of the ferromagnetic free layer.

40. (Previously Presented) The magnetic memory of claim 39 wherein the ferromagnetic free layer includes at least one of Co, Fe, and Ni and wherein the nonmagnetic capping layer includes at least one of Pt, Pd, Au, Ta, and Cr.